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IS 8453 (1977): Code of practice for construction of polyethylene embedded earthen bins for bulk storage of foodgrains [FAD 16: Foodgrains, Starches and Ready to Eat Foods]



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IS : 8453 - 1977

Indian Standard
CODE OF PRACTICE FOR
CONSTRUCTION OF POLYETHYLENE
EMBEDDED EARTHEN BINS FOR
BULK STORAGE OF FOODGRAINS

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Prior to 1977

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Indian Standard

CODE OF PRACTICE FOR CONSTRUCTION OF POLYETHYLENE EMBEDDED EARTHEN BINS FOR BULK STORAGE OF FOODGRAINS

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Indian Standard

CODE OF PRACTICE FOR CONSTRUCTION OF POLYETHYLENE EMBEDDED EARTHEN BINS FOR BULK STORAGE OF FOODGRAINS

0. FOREWORD

0.1 This Indian Standard was adopted by the Indian Standards Institution on 29 April 1977, after the draft finalized by the Storage Structures and Storage Management Sectional Committee had been approved by the Agricultural and Food Products Division Council.

0.2 The polyethylene embedded earthen bins are commonly known as 'Pusa bins'. The construction of these bins is based on the ecological requirements of storage pests for ensuring safety of the grain from these pests; and easy availability of materials, namely, bricks, mud, timber and polyethylene film. These bins should be kept under a roof to safeguard against rain-water.

0.3 The materials required for these bins may be made available at a central place and supplied to the farmers. Therefore, with a view to providing guidelines for the construction of these bins, this Indian Standard has been formulated. These bins are successfully used for storage of dry and cool wheat.

0.4 In the formulation of this standard, the basic information has been supplied by the Indian Agricultural Research Institute, New Delhi.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test, shall be rounded off in accordance with IS : 2-1960*. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

1. SCOPE

1.1 This standard prescribes the requirements of material, dimensions and the method of construction of polyethylene embedded earthen bins for bulk storage of foodgrains.

*Rules for rounding off numerical values (*revised*).

2. CAPACITIES AND DIMENSIONS

2.1 The recommended capacities and dimensions of the earthen bins shall be as given in Table 1.

TABLE 1 RECOMMENDED CAPACITIES AND DIMENSIONS OF EARTHEN BINS

(Clauses 2.1 and 3.2)

Sl. No.	CAPACITY (TONNES)*	INTERNAL DIMENSIONS			QUANTITY OF MATERIAL REQUIRED		
		Length	Breadth	Height	Polyethylene	Unburnt Bricks	Burnt Bricks
		(mm)	(mm)	(mm)	(m)	(No.)	(No.)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
i)	0.4	610	610	1 360	4.5	600	100
ii)	0.8	840	840	1 400	6.5	900	130
iii)	1.7	1 400	1 000	1 600	8.5	1 100	150
iv)	3.2	1 720	1 520	1 600	11.6	1 600	280

*Calculated at the rate of 1.3 m³ for 1 000 kg of wheat.

3. MATERIALS OF CONSTRUCTION

3.1 The following materials shall be used for construction of the earthen bins:

- Bricks* — burnt (see IS : 1077-1966*).
- Bricks* — unburnt.
- Polyethylene Film* — 18 μ m, 1 800 mm width.
- Wooden Frame* — made in the form of an inverted 'P' with an additional projection at a distance of 450 mm from the end of the structure. The wood used shall be seasoned, of a good quality and properly treated against termites.
- Mud Slabs* — 50 mm thick.
- Exit Pipe* — of diameter 90 mm made of galvanized iron or plastic.

3.2 The number of bricks and size of polyethylene sheets used for various bins shall be as given in Table 1.

4. METHOD OF CONSTRUCTION

4.0 The method of construction of a bin with capacity of 2 tonnes is given in 4.1 to 4.5.

4.1 Select a hard floor and prepare a platform of 1 620 \times 1 220 \times 70 mm with unburnt bricks except 110 mm outer periphery which shall be built

*Specification for common burnt building bricks (first revision).

with burnt bricks (Fig. 1A). Place a polyethylene film of $1\,740 \times 1\,340$ mm over the platform so that it extends by 60 mm on all the four sides of the platform (Fig. 1B).

4.1.1 Using unburnt bricks, make another platform of the dimensions $1\,620 \times 1\,220 \times 70$ mm over the polyethylene film (Fig. 1C). Construct the inner wall of the bin with the unburnt bricks up to the height of 1 600 mm and an internal area of $1\,400 \times 1\,000$ mm (Fig. 1D). Plaster the inside of the structure with mud.

4.2 Take a wooden frame shaped inverted 'P' with an additional pole at a distance of 450 mm from the end of the structure and place it at the top of the structure for supporting the mud slabs. Place an additional pole $1\,620 \times 40 \times 40$ mm by the side of the frame at a distance of 250 mm from other end of structure to give further support to the roof (Fig. 1E).

4.3 Cut a small hole of 125 mm diameter in the middle front side of the tin near the floor in the second layer of bricks, to accommodate the exit pipe (see 4.5).

4.4 Prepare slabs by casting mud mixed with *BHUSA* or paddy husk in a wooden frame of $450 \times 300 \times 50$ mm size. To give strength to slabs, place bamboo split or *Saccharum* stem of 10 mm diameter in the mud, 5 pieces along length and 8 pieces along the breadth. Place the mud slabs on the frame and prepare the roof except on the area of main hole (500×500 mm) in one corner (the square area of the wooden frame). Plaster the structure with mud on the top and 4 sides and allow to dry well (Fig. 1F).

4.5 Take a cover of polyethylene film of $1\,660 \times 1\,260 \times 1\,800$ mm height made (by heat sealing) in the form of mosquito net and slowly place it over the structure. At this stage, fit the pouch made out of galvanized iron sheet or a plastic pipe of 90 mm diameter with a cap in the hole made for exit of the grain. Bring the polyethylene cover to the lowermost level so as to meet the polyethylene film placed earlier on the base. Heat seal the extremities of the polyethylene cover and the film. Cut a small hole in the polyethylene cover to accommodate the exit pipe and pull out the pouch through this hole. Apply a little soft wax around the pouch touching the polyethylene film to make the portion completely air-tight.

4.6 Cut diagonally the polyethylene film covering the manhole. Erect the outer walls of the structure to a height of 1790 mm, using burnt bricks for the first 450 mm and the unburnt bricks for the rest of the portion. Alternatively, a band of metal plate may be provided round the structure for first 450 mm. Place mud slab 50 mm thick on the top leaving the portion of the manhole. Plaster the top and the sides of the structure and dry the structure before use (Fig. 1H).

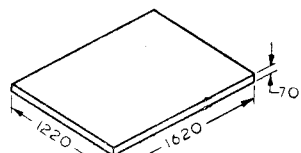


FIG. 1A

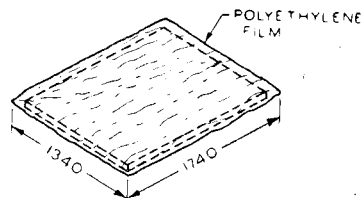


FIG. 1B

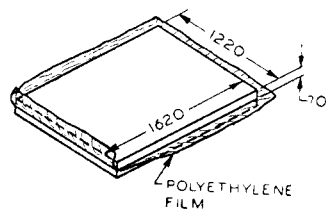


FIG. 1C

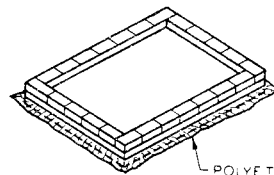


FIG. 1D

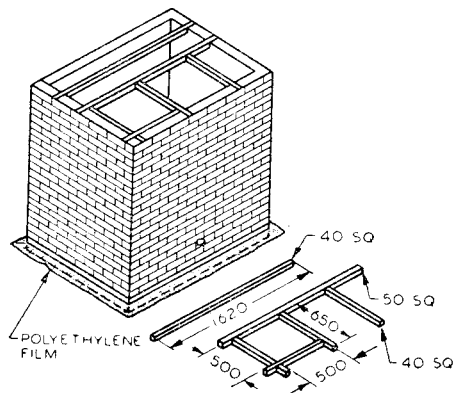
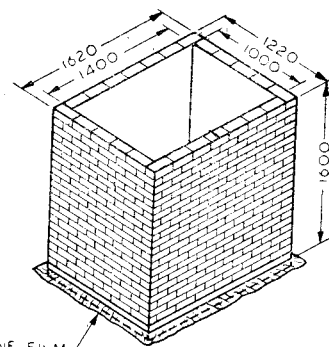


FIG. 1E

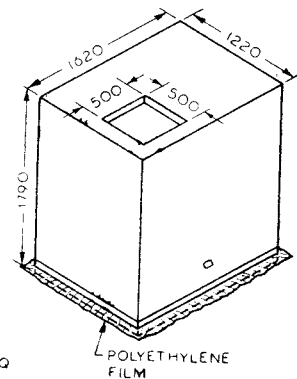


FIG. 1F

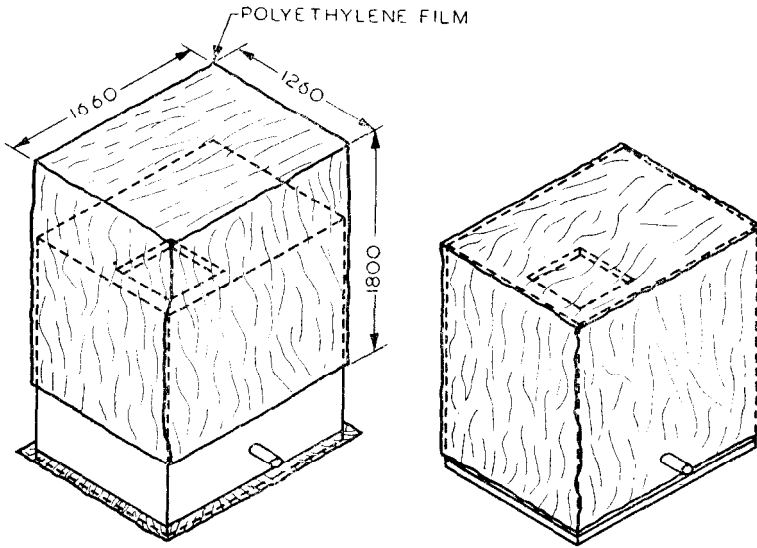


FIG. 1G

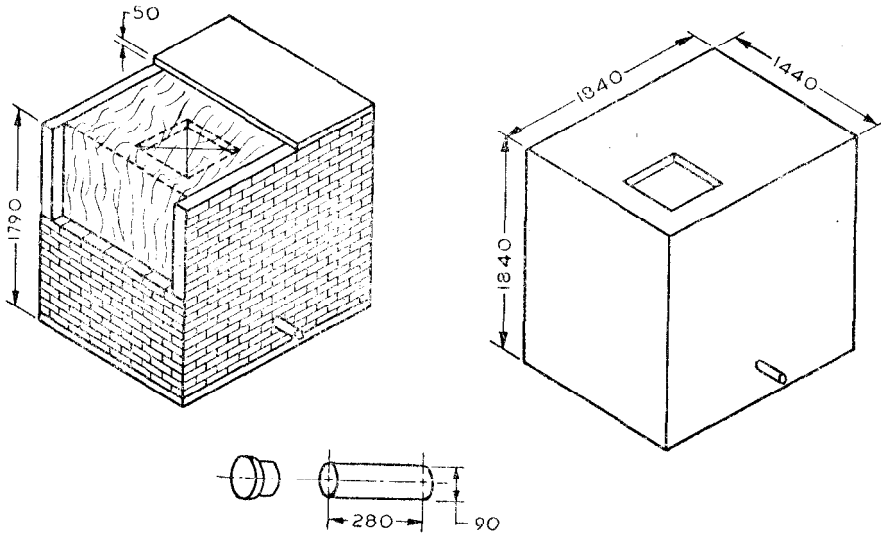


FIG. 1H

All dimensions in millimetres.

FIG. 1 CONSTRUCTIONAL DETAILS OF POLYETHYLENE EMBEDDED EARTHEN BINS

4.7 After the structure has been filled with grain, the cut portion of the polyethylene film should be finally sealed with adhesive tape and the man-hole should be plugged with mud.

NOTE — It is essential that the bin should be completely dried before use and the moisture content of grain is lowered to less than 10 percent before storage. For efficient performance, the bin should be completely filled with grain so that the space inside is kept to the minimum. A roof should be constructed over these bins to safeguard against rain-water.